

Action Tremor Associated with Lamotrigine Monotherapy

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Lamotrigine (LTG) is associated with a tremor when given in combination with valproic acid; however, a tremor associated with lamotrigine monotherapy is rare. Here, we report a case of positional and action tremor associated with lamotrigine use. Based on the temporal relationship, it is conceivable that lamotrigine increases serotonin transmission or affects basal ganglia dopamine activity, thereby causing the tremor. **Journal of Movement Disorders 2010;3:18-19**

Key Words: Tremor, Lamotrigine.

A variety of movement disorders can occur as a consequence of the administration of antiepileptic drugs (AEDs). Tremor is one of the most common side effects of AEDs such as valproic acid; however, there are few reports of tremor associated with other AEDs.¹

Lamotrigine (LTG) is a widely used broad-spectrum AED. There have been few reports on central nervous system side effects with its use. Here, we experienced a case of positional and action tremor associated with lamotrigine use.

Case

A 35-year-old female with a 10-year history of temporal lobe epilepsy had been treated with 1,200 mg of carbamazepine. Recently, her medication had been switched to LTG because of an increase in seizure frequency without any precipitating factors. The dosage was increased slowly to 200 mg per day, and the frequency of her seizures decreased. However, 6 months after LTG titration, she developed postural and kinetic tremors in both hands. The patient had no history of movement disorders or neurological disease other than seizures, and there was no family history of movement disorders.

The findings of a neurological examination were unremarkable, except for the presence of an action tremor and a very mild postural tremor. On examination of handwriting ability, the patient showed a combination of excessive squeezing of the pen and severe writing tremor. She had no bradykinesia, rigidity, or postural imbalance (see Video segment 1). The following blood tests all gave normal results: full blood count, urea, creatinine, electrolytes, liver function tests, vitamin B₁₂ level, thyroid function tests, and autoimmune screen.

A diagnosis of LTG-induced tremor was considered, and the LTG was switched to 600 mg of oxcarbazepine (OXC). There was no worsening of her seizures, and a gradual reduction in the frequency of the tremor was observed in the 6 months after withdrawing the LTG (see Video segment 2).

Discussion

LTG has rarely been linked to the development of movement disorders, including myoclonus, tics, Tourette's syndrome, chorea, and blepharospasm, in epileptic patients.² In add-on trials, LTG was associated with tremor in 4% of patients vs. 1% on placebo, although there was no difference in tremor incidence in a placebo-controlled monotherapy trial.¹

The exact mechanism of LTG-induced tremor is unclear and speculative. LTG affects voltage-dependent sodium conductance at N-type calcium channels and increases serotonin trans-

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mission by downregulating the cortical 5-HT_{1A} receptor.³ Intriguingly, this mechanism has occasionally been linked to the exacerbation of seizures and induction of involuntary movements. In addition, LTG does not directly affect striatal dopamine receptors, although LTG increased the basal ganglia dopamine activity in one mouse model of Parkinson's disease, leading to increased motor activity.^{4,5} Many drug-induced movement disorders are related to an enhanced dopaminergic system. Therefore, a possible explanation is the action of LTG on dopamine metabolism via inhibition of the release of presynaptic excitatory neurotransmitters, which induce the striatal dopaminergic system secondarily.⁶

In conclusion, we report a patient who developed an LTG-induced tremor that resolved with OXC. This case suggests that OXC and LTG have different dopaminergic effects, which differ in their association with involuntary movements such as tremor.

Legend to the Video

Segment 1

The patient had a severe writing tremor and a very mild po-

stural tremor. There was no bradykinesia, rigidity, or postural imbalance.

Segment 2

Six months after lamotrigine withdrawal, a gradual reduction in the frequency of the tremor was observed.

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